A Venous Cause for Facial Canal Enlargement: Multidetector Row CT Findings and Histopathologic Correlation

SUMMARY: An enlarged facial nerve canal can be a seen in both pathologic and nonpathologic processes. The purposes of this report are the following: 1) to present a rare cause of bony facial nerve canal enlargement, due to an enlarged vein, with high-resolution MDCT and histopathologic correlation; and 2) to discuss the vascular anatomy that gives rise to this variant.

ABBREVIATIONS: A = artery; AICA = anterior inferior cerebellar artery; GSPN = greater superficial petrosal nerve; MDCT = multidetector row CT

Discussion
Arterial supply to the facial nerve is segmental. The intracanalicular facial nerve is supplied by the AICA. The internal auditory artery, a branch of AICA, supplies the labyrinthine segment of the facial nerve.

The petrosal artery (also referred to as the superficial petrosal artery) branches off from the middle meningeal artery immediately after it enters the skull through the foramen spinosum. It enters the hiatus of the GSPN accompanying that nerve and provides arterial arborization to the geniculate ganglion and the tympanic segment (Fig 3). There is occasionally a second branch of the middle meningeal artery; the superior tympanic artery, which either anastomoses with the petrosal artery or itself extends into the facial canal (sometimes accompanying the lesser petrosal nerve) (Fig 3).4,5

The stylomastoid artery from the posterior auricular artery ascends via the stylomastoid foramen to supply the mastoid segment. It anastomoses with the petrosal artery in the tympanic segment of the facial nerve.

Venous drainage of the facial nerve generally accompanies the named arteries within the nerve sheath. Ultimately the venous drainage from the geniculate ganglion and tympanic segment is into the middle meningeal vein. In our case, the V-shaped configuration of the venous channels suggests that these represent prominent petrosal and superior tympanic veins.

Causes of facial canal enlargement are numerous. Congenital/developmental variants include a persistent stapedial artery (associated with absent foramen spinosum), congenital cholesteatoma, and meningocele with or without a CSF fistula involving the facial canal. Primary facial nerve neoplasms include schwannomas, neurofibromas, hemangiomas, meningiomas, epidermoid, and paragangliomas. Also, perineural spread of parotid (and other) malignancies via this route, leukemia infiltration, and metastatic disease affecting the facial nerve have been described.

Although the presence of veins and arteries in the facial canal is well known, venous causes of facial canal enlargement have not been previously described. Being aware of a venous etiology of facial canal enlargement can help prevent unnecessary work-up and intervention in asymptomatic patients. The otologist can be alerted to the presence of this vascular variant if middle cranial fossa surgical procedures en-
tailing elevation of the dura are planned to decrease intraoperative bleeding risk.

References